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<b>UTILITY PATENT APPLICATION TRANSMITTAL</b> <small>(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))</small>	Attorney Docket No.	D.N.7167
	First Inventor or Application Identifier	Abrams, L.B.
	Title	Flocked Transfer and Article of, etc.
	Express Mail Label No.	

<b>APPLICATION ELEMENTS</b> <small>See MPEP chapter 600 concerning utility patent application contents.</small>	<b>ADDRESS TO:</b> Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
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1. <input checked="" type="checkbox"/> * Fee Transmittal Form (e.g., PTO/SB/17) <small>(Submit an original and a duplicate for fee processing)</small>	6. <input type="checkbox"/> Microfiche Computer Program (Appendix)
2. <input checked="" type="checkbox"/> Specification [Total Pages 12] <small>(preferred arrangement set forth below)</small> <ul style="list-style-type: none"><li>- Descriptive title of the invention</li><li>- Cross References to Related Applications</li><li>- Statement Regarding Fed sponsored R &amp; D</li><li>- Reference to Microfiche Appendix</li><li>- Background of the invention</li><li>- Brief Summary of the invention</li><li>- Brief Description of the Drawings (if filed)</li><li>- Detailed Description</li><li>- Claim(s)</li><li>- Abstract of the Disclosure</li></ul>	7. Nucleotide and/or Amino Acid Sequence Submission <small>(if applicable, all necessary)</small> <ul style="list-style-type: none"><li>a. <input type="checkbox"/> Computer Readable Copy</li><li>b. <input type="checkbox"/> Paper Copy (identical to computer copy)</li><li>c. <input type="checkbox"/> Statement verifying identity of above copies</li></ul>
3. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets 3]	
4. Oath or Declaration w/Power [Total Pages 15] <ul style="list-style-type: none"><li>a. <input checked="" type="checkbox"/> Newly executed (original or copy)</li><li>b. <input type="checkbox"/> Copy from a prior application (37 C.F.R. § 1.63(d)) <small>(for continuation/divisional with Box 77 completed)</small> <small>[Note Box 5 below]</small></li><li>i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b> <small>Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).</small></li></ul>	

<b>ACCOMPANYING APPLICATION PARTS</b>	
8. <input type="checkbox"/> Assignment Papers (cover sheet & document(s))	
9. <input type="checkbox"/> 37 C.F.R. § 3.73(b) Statement <small>(when there is an assignee)</small>	<input type="checkbox"/> Power of Attorney
10. <input type="checkbox"/> English Translation Document (if applicable)	
11. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449	<input type="checkbox"/> Copies of IDS Citations
12. <input type="checkbox"/> Preliminary Amendment	
13. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <small>(Should be specifically itemized)</small>	
14. <input checked="" type="checkbox"/> * Small Entity Statement(s) <small>(PTO/SB-09-12)</small>	<input type="checkbox"/> Statement filed in prior application, Status still proper and desired
15. <input type="checkbox"/> Certified Copy of Priority Document(s) <small>(if foreign priority is claimed)</small>	
16. <input type="checkbox"/> Other: .....	

\* NOTE FOR ITEMS 1 & 14: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.17), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:  
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: \_\_\_\_\_  
Prior application Information: Examiner \_\_\_\_\_ Group / Art Unit: \_\_\_\_\_

18. CORRESPONDENCE ADDRESS  
☐ Customer Number or Bar Code Label ☒ Correspondence address below  
(Insert Customer No. or Attach bar code label here)

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Name (Print/Type)	Paul M. Denk	Registration No. (Attorney/Agent)	22,598
Signature		Date	07/2/00

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

Applicant or Patentee: Louis Brown Abrams Attorney's  
Serial or Patent No. : \_\_\_\_\_ Docket  
Filed or Issued: \_\_\_\_\_ No. 7167  
For: "Flocked Transfer and Article of Manufacture Including the Flocked Transfer"

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) and 1.27(c) - SMALL BUSINESS CONCERN

I hereby declare that I am

- ( ) the owner of the small business concern identified below:  
(X) an official of the small business concern empowered to act on behalf of the concern identified below.

NAME OF CONCERN: High Voltage Graphics, Inc. .

ADDRESS OF CONCERN: 811 Stockton Avenue  
Fort Collins, Colorado 80522

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled  
"Flocked Transfer and Article of Manufacture Including the Flocked Transfer"

inventor(s) Louis Brown Abrams

described in:

- (X) the specification filed herewith  
( ) the application Serial No. \_\_\_\_\_  
( ) Patent No. \_\_\_\_\_ issued \_\_\_\_\_.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below\* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e). \*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

( ) INDIVIDUAL ( ) SMALL BUSINESS CONCERN ( ) NONPROFIT ORGANIZATION

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

( ) INDIVIDUAL ( ) SMALL BUSINESS CONCERN ( ) NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Louis Brown Abrams

TITLE OF PERSON OTHER THAN OWNER President

ADDRESS OF PERSON SIGNING 811 Stockton Avenue

Fort Collins, Colorado 80522

SIGNATURE *Louis Brown Abrams*, President / DATE 4 July 2000  
Louis Brown Abrams

## SPECIFICATION

To All Whom It May Concern:

Be It Known That I, LOUIS BROWN ABRAMS, a citizen of the United States, resident of the County of Larimer, City of Fort Collins, State of Colorado, whose post office address is P.O. Box 41, Fort Collins, Colorado 80522-0041, have invented new and useful improvements in

### **FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE FLOCKED TRANSFER**

## **CROSS-REFERENCE TO RELATED APPLICATIONS**

Not Applicable

## **STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

Not Applicable.

## **BACKGROUND OF THE INVENTION**

This invention relates to flocked transfers, and, in particular, to an improved method of making flocked transfers which can reduce the cost and time required of producing transfers by a significant amount.

Heretofore, flocked transfers have generally been produced by applying a release agent to a release sheet. The flocking is applied to the release sheet in the desired pattern. A binder and a permanent hot melt adhesive are applied to the back of the flocking, and the transfer is allowed to dry. The binder is required hold the flocking in the desired pattern. The hot melt adhesive, which is applied to the transfer as a powder, is used to adhere the transfer to a substrate, such as an article of clothing, a neoprene pad, etc. The transfer is applied to the substrate by placing the transfer on the substrate with the dried hot melt adhesive in contact with the substrate. Heat, such as from an iron, is then applied to the release sheet. The heat melts the hot melt adhesive to cause hot melt adhesive to flow into intimate contact with the substrate, forming a mechanical and molecular bond with the substrate. The release agent then allows for the release sheet to be removed from the transfer, leaving the flocking exposed on the substrate.

This traditional method has worked well for years. However, the method can be improved upon to reduce the cost of producing the transfer, and hence, the cost of the item containing the transfer.

## BRIEF SUMMARY OF THE INVENTION

In accordance with the invention, generally stated, a flocked transfer of the present invention is produced by applying a release agent to a release sheet and then applying the flocking to the release agent. Unlike the traditional method, a binder and adhesive are not applied to the ends of the flock.

To form an article of manufacture with the flocked transfer, a hot melt film (in the form of a sheet or cut to shape) is positioned on the substrate to which the transfer is to be applied. The hot melt film is preferably a polyester or polyurethane film, but can be any thermosetting film. The flock with the release adhesive and release sheet (i.e., the transfer) is then placed on the sheet of hot melt film with the release sheet up, so that the flocking is in contact with the hot melt film. Heat is then applied to the transfer. The heat melts the hot melt film, and secures the flock to the substrate. Because the film is thermosetting, even if it is subsequently subjected to heat, it will not remelt, nor become tacky, and hence, there is no risk of fibers becoming matted down in any of this type of adhesive, which could otherwise ruin the plush pile effect. In addition, it is likely that the use of a thermoset powder could be added to a bond print latex flock adhesive binder, to serve as a method for increasing the adhesion and again reducing the risk of any remelting, or becoming tacky, when the flock transfer is subsequently exposed to heat. It is known that there is a much stronger adhesion with thermosetting materials, because thermoset materials will cross-link with a chemical reaction and thereby adhere the flock fibers to it, which become chemically attached thereto. Through the usage of this invention, the finished flock surface is more plush, soft, because more of the fiber is exposed and extends upwardly out of the adhesive, than with the screen-printed latex, as currently used. Also, this affords better soil release during washing or cleaning because of less fiber/adhesive entanglement occurs with the flock, during application.

## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 is a cross-sectional view of a prior art flock transfer;

FIG. 2 is a cross-sectional view of a flock transfer of the present invention;

FIG. 3 is an exploded view of the transfer, a hot melt sheet, and a substrate used to make an article of manufacture;

FIG. 4 is a cross-sectional view of an article of manufacture using the transfer of the present invention, showing a part of the transfer applied to part of the substrate and a part of the transfer and hot melt film spaced from the substrate; and,

FIG. 5 is a schematic drawing of a process for continuously producing articles of manufacture, such as mouse pads, coasters, etc.

Corresponding reference numerals will be used throughout the several figures of the drawings.

## DETAILED DESCRIPTION OF THE INVENTION

The following detailed description illustrates the invention by way of example and not by way of limitation. This description will clearly enable one skilled in the art to make and use the invention, including what I presently believe is the best mode of carrying out the invention.

A prior art flocked transfer 101 is shown in FIG. 1. As is known, such transfers include a dimensionally stable release sheet 103 to which a conventional flock transfer release adhesive 105 is applied in a pattern which corresponds to the overall image to be flocked. The flock 107 is then electrostatically coated into the release adhesive 105. A binder adhesive 109 is applied to the exposed ends of the flock to bind the flock together as a unit. Lastly, a hot melt adhesive 111 is applied. The transfer is then allowed to dry. The transfer is applied to a substrate, as is known, by positioning the transfer on a substrate, such as a shirt or other item of clothing, with the hot melt

adhesive in contact with the substrate, and applying heat to the transfer. The heat activates the hot melt adhesive to adhere the transfer to the substrate. This process is described in my prior patent, U.S. Pat. No. 4,810,549, as well as in my co-pending application, Ser. No. 09/548,839 filed April 13, 2000, both of which are incorporated herein by reference.

A flocked transfer 1 of the present invention is shown in FIG. 2. The transfer 1 of the present invention includes a release sheet 3 to which a conventional release agent 5, such as wax, has been applied. The release agent is applied to the sheet in the shape of the pattern of the flocking. Flocking 7 is then applied to the release agent, and hence to the release sheet, to form the transfer. The flocking 7 is applied, for example, in the manner as described in my prior patent, U.S. Pat. No. 4,810,549, which is incorporated herein by reference. Unlike the prior art processes, the transfer 1 is made without the use of a binder adhesive or a hot melt adhesive. As is discussed below, a thermosetting film is used to adhere the transfer to a substrate.

An article of manufacture, such as an item of clothing having a transfer 1 applied thereto, a mouse pad, coaster, or other item having a flocked surface is easily produced using the transfer 1. The article of manufacture 11 is produced by positioning a hot melt sheet 13 between a substrate 15 and the flocked release sheet. The hot melt sheet is, for example, a sheet of thermosetting polyester, available from Bostik, Inc. The hot melt sheet can also be made from a thermosetting polyurethane. Any other thermosetting film should also work well. The substrate can be an item of clothing, a rubber pad (for producing a mouse pad or coaster), etc. The hot melt sheet can be precut to correspond to the shape of the transfer 1. The transfer 1 is then positioned on the hot melt sheet with the flock 5 against the hot melt sheet 13. Heat is applied to the transfer through the release sheet to activate the hot melt sheet. The hot melt sheet then acts to



both bind the flock 5 together and to adhere the flock 5 to the substrate 15. Preferably, to assemble the article, the flocked release sheet, the thermosetting film, and the substrate are brought together and passed through a heat-laminating press where the three parts are subject to temperature of about 300°F (about 150°C) and pressure (about 40-50 psi) for about 30 seconds. It has been found that a medium-to-firm pressure has been most advantageous in providing for assembly of this type of plush flocked transfer. The pressure and heat will cause the hot melt film to adhere to the flock and the substrate. Additionally, the hot melt film will cross-link or cure, to give a strong attachment of the flock to the substrate.

Articles, such as mouse pads or coaster, in which the entire top surface of the article is covered with the flocking can be produced on a continuous basis, as shown in FIG. 5. Rolls 21, 23, and 25 of a flocked release sheet 1, the hot melt film 13, and the substrate 15 are provided. The three parts are brought together at a laminating station 33. Rollers can be provided in front of the station 33 so that the three elements are adjacent each other as they enter the laminating station. In the laminating station, heat and pressure are applied to the three sheets (the flocked release sheet, the hot melt film, and the substrate) to melt the hot melt film. The melted hot melt film will then cure or cross-link, as noted above, to adhere the flock to the substrate. A web 35 exits the laminating station. The web 35 is then allowed to cool. The web 35 is ultimately directed to a cutting station where it is cut into individual articles. Once the web 35 is cooled, it can be directed immediately to a cutting station (after the sheet 35 cools), or can it can be wound up on an uptake roller to be cut into individual articles at a later time, or at a different location. At the cutting station, the release sheet is removed from the flock and gathered on an uptake roll or is otherwise disposed of. After the release sheet has been removed from the flock, the substrate with the flock adhered thereto is

cut to form the articles 11. It is also likely that one could remove the release liner either before or after the die cutting procedure.

Preferably, the release sheet is flocked and supplied in roll form as shown in FIG. 5. However, the flocking of the release sheet could be made part of the process.

To produce flocked articles, such as shirts, jackets, etc., which cannot be easily flocked on a continuous basis, the hot melt sheet can be applied to the transfer 1 prior to applying the transfer to the substrate. To do this, the thermosetting hot melt film is placed in contact with the flock of the transfer, and the transfer and release sheet are heated to a temperature at which the thermosetting hot melt film become tacky, but below the temperature at which the thermosetting hot melt film begins to cure and cross-link. This will adhere the thermosetting hot melt film to the transfer 1 to form a transfer which can later be applied to an article by positioning the transfer with the hot melt film in position on the article (i.e., piece of clothing) and applying heat and pressure to the transfer, for example, with an iron, sufficient to melt the hot melt film, to cause the hot melt film to cure and cross-link.

The method eliminates two steps from the prior art method: (1) application of the binder adhesive and (2) application, cleaning, sintering, and drying of the hot melt adhesive. In a continuous process, the present method also eliminates a station for applying the binder and hot melt adhesives as well as a station for drying the completed transfer. Because a station is not needed to apply (i.e., print) the binder and hot melt adhesives to the flocking as part of the transfer, the machinery required to produce the article 11 is much less expensive (both in actual costs and in maintenance costs). Additionally, because the binder adhesive and hot melt adhesive is not used, the cost of the article of manufacture is significantly reduced.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

## CLAIMS:

1. A flocked transfer consisting essentially of a release sheet, a release agent on the release sheet, and flock on the release agent; the flock being formed in a desired patter; the release agent holding the flock to the release sheet.

2. An article of manufacture including the transfer of Claim 1 wherein the transfer is adhered to a substrate.

3. The article of manufacture of Claim 2 wherein the transfer is adhered to the substrate using a thermosetting hot melt sheet.

4. The article of claim 3 wherein the thermosetting film is a thermosetting polyurethane film or a thermosetting polyester film.

5 A method of producing an article of manufacture having a flocked surface; the method comprising:

supplying a flocked release sheet comprising a release sheet with flock adhered thereto;

adhering a thermosetting hot melt film to the flock of the flocked release sheet; and

adhering the thermosetting hot melt file to a substrate to adhere the flock to the substrate.

6. The method of claim 5 wherein the step of adhering the thermosetting hot melt film to the flocked release sheet comprises heating the thermosetting hot melt film to a temperature at which the hot melt film becomes tacky, but below a temperature at which the hot melt film begins to cure and cross-link.

7. The method of claim 5 wherein the step of adhering the thermosetting hot melt film to the substrate comprises heating the hot melt film to a temperature at which the hot melt film cures and cross-links.

8. The method of Claim 7 wherein the hot melt film is heated to about 300°F.

9. The method of claim 5 wherein the step of adhering the thermosetting hot melt film to the flocked release sheet and the step of adhering the thermosetting hot melt film to the substrate are performed in a substantially simultaneously in a single operation.

10. The method of claim 5 wherein the method is continuous.

11. The method of claim 5 wherein the thermosetting film is a thermosetting polyurethane film or a thermosetting polyester film.

12. A method for continuously producing an article of manufacture having a flocked surface; the method comprising:

providing flocked release sheet consisting essentially of a release sheet with flock applied thereto;

providing a thermosetting hot melt film;

providing a substrate;

bringing the substrate, thermosetting hot melt film and flocked release sheet together with the hot melt film between the release sheet and the substrate and with the flock in contact with the thermosetting hot melt film, to produce a pre-assembly;

applying heat to the pre-assembly to adhere the flocking to the substrate; and

removing the release sheet from the flocking to produce a flocked substrate.

13. The method of claim 12 including a step of applying pressure to the pre-assembly.

14. The method of claim 12 wherein the step of applying heat comprises heating the pre-assembly to about 300°F.



## ABSTRACT OF THE DISCLOSURE

A flocked transfer is produced by applying a release agent to a release sheet and then applying the flocking to the release agent. Unlike the traditional method, a binder and hot melt film is not applied to the back of the flock. The transfer (which is essentially a flocked release sheet) is then applied to a substrate (i.e., an item of clothing, a rubber pad, etc.) by positioning a sheet of thermosetting hot melt film on the substrate; placing the transfer on the hot melt film with the flock in contact with the hot melt film; and applying heat and pressure. The heat melts the thermosetting hot melt film to bind the flock to the substrate and binds the flocking together. This method reduces the costs involved in producing flocked articles, especially for articles produced on a continuous basis.

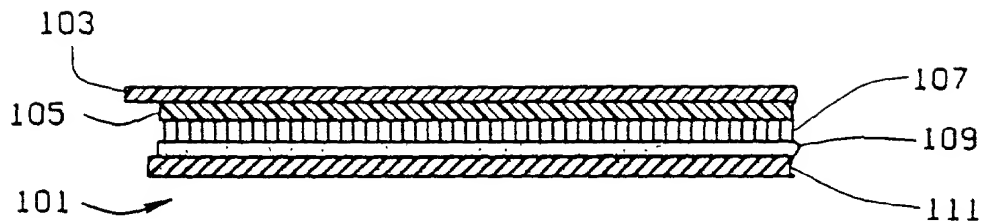


FIG. 1  
PRIOR ART

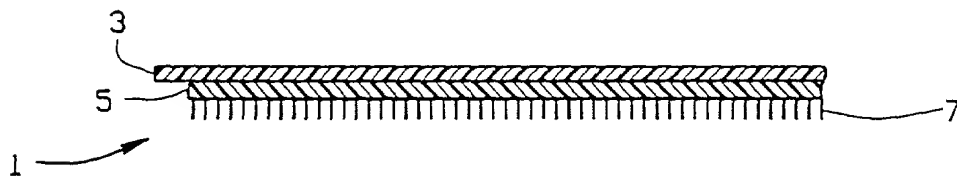


FIG. 2

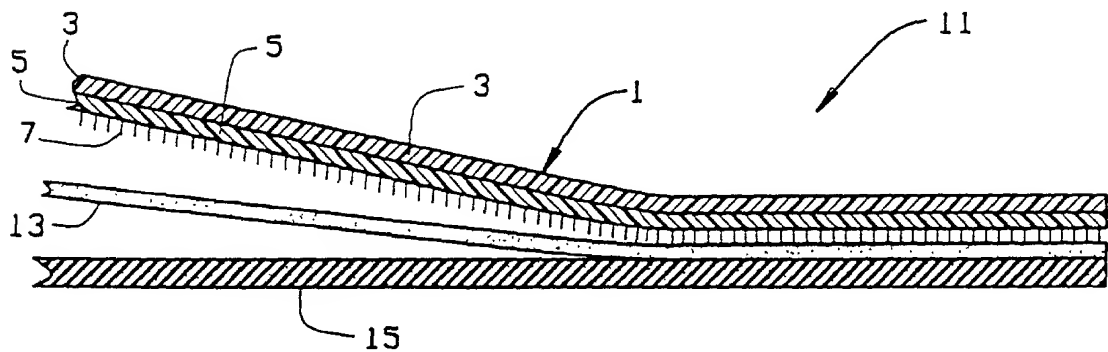


FIG. 4

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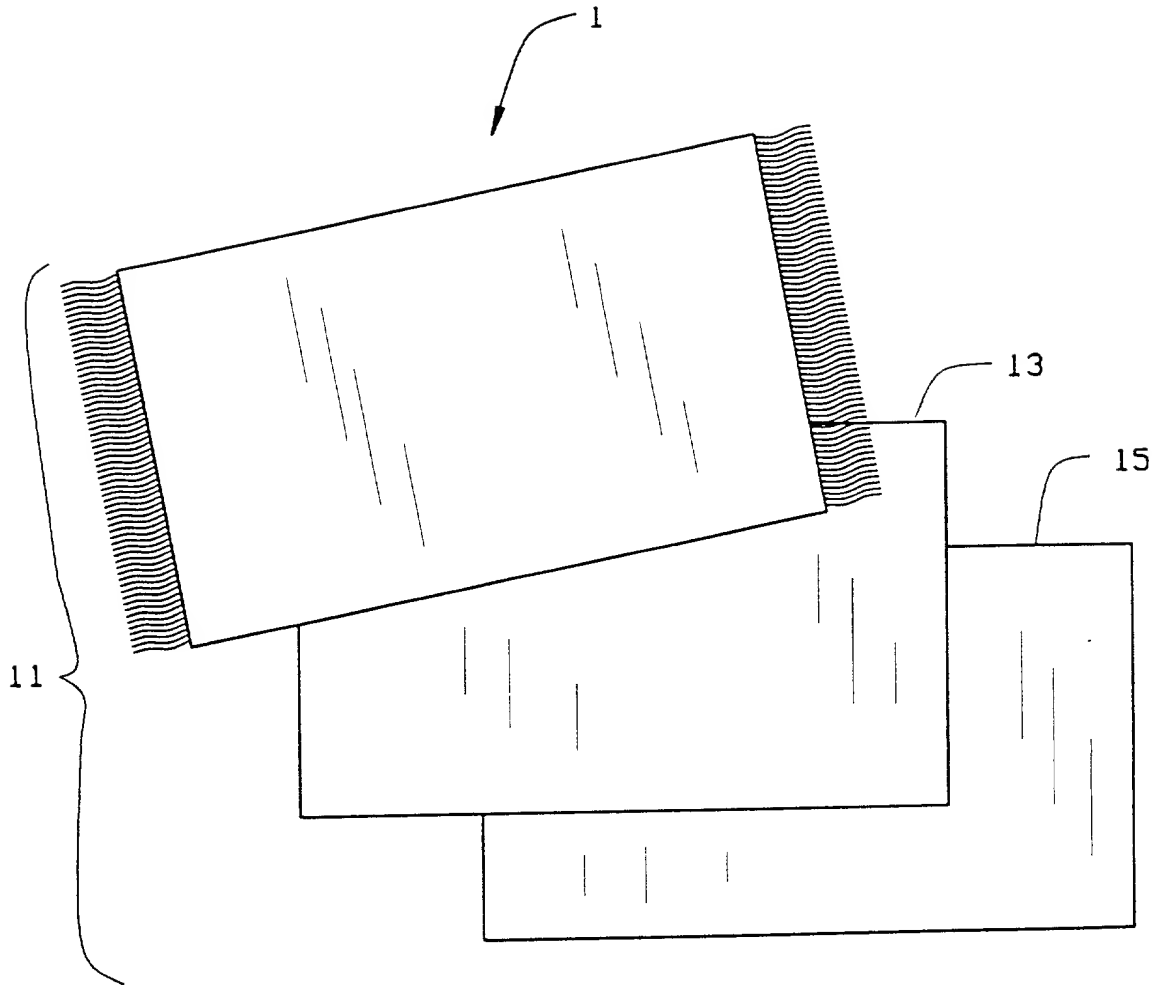
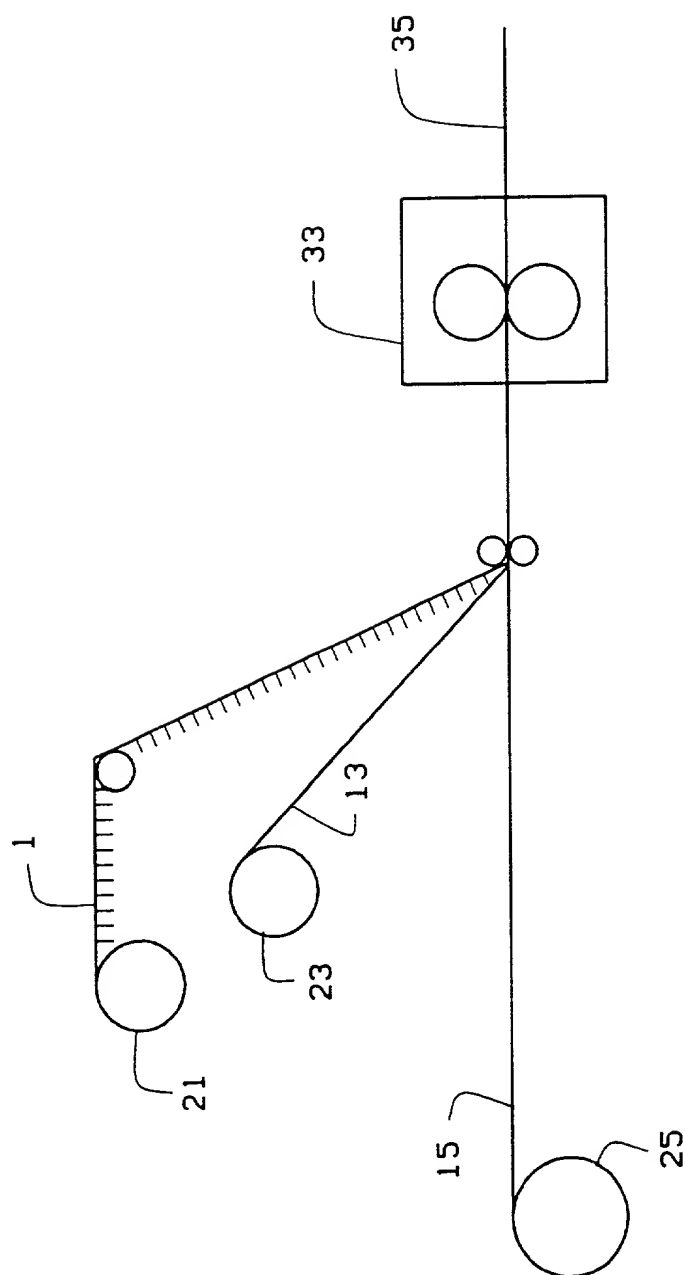


FIG. 3



5.  
6.  
7.  
8.

## DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is

### **FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE FLOCKED TRANSFER**

the specification of which

(check one)   x   is attached hereto.  
           was filed on                      as  
Application Serial No.           ,  
and was amended on                     .  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1,56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed: N/A.

Prior Foreign Application(s):

Priority Claimed

<u>                    </u> (Number)	<u>                    </u> (Country)	<u>                    </u> (Day/Month/Year Filed)	<u>          </u> Yes	<u>          </u> No
<u>                    </u> (Number)	<u>                    </u> (Country)	<u>                    </u> (Day/Month/Year Filed)	<u>          </u> Yes	<u>          </u> No

We hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below: N/A

\_\_\_\_\_  
Application Number

\_\_\_\_\_  
Filing Date

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a), which occurred between the filing date of the prior application and the national or PCT international filing date of this application: N/A

\_\_\_\_\_  
(Serial No.)

\_\_\_\_\_  
(Filing Date)

\_\_\_\_\_  
(Status)

\_\_\_\_\_  
(Serial No.)

\_\_\_\_\_  
(Filing Date)

\_\_\_\_\_  
(Status)

I do hereby appoint Paul M. Denk, Patent Office registration No. 22,598, with offices at 763 South New Ballas Road, St. Louis, Missouri 63141, Tel. No. (314) 872-8136, as my attorney and agent with full power of substitution and revocation, to prosecute the application above set forth, and to transact all business in the United States Patent and Trademark Office in connection therewith.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole inventor:

Louis Brown Abrams

Inventor's signature:

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Date:

4 July 2007

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